

REMARKS

This is in response to the Office Actions dated July 27, 2004 and March 9, 2004. New claims 25-38 have been added. Thus, claims 1-38 are now pending. An RCE has been filed herewith.

Initially, the undersigned would like to thank the Examiner for the courtesy extended during the personal interview held at the USPTO on July 20, 2004. The claims have been amended to include language suggested by the Examiner in order to more clearly define over the cited art.

Claim 1

Claim 1 stands rejected under 35 U.S.C. Section 103(a) as being allegedly unpatentable over Suzuki in view of Sasaki. This Section 103(a) rejection is respectfully traversed for at least the following reasons.

Claim 1 requires "a vertical alignment type liquid crystal layer . . . 4-divided domain, the first substrate includes two first regions each having an orientation-regulating force for orienting the liquid crystal molecules of the liquid crystal layer in a first direction and a second region provided between the two first regions and having an orientation-regulating force for orienting the liquid crystal molecules in a second direction that is opposite to the first direction, while the second substrate includes a third region having an orientation-regulating force for orienting the liquid crystal molecules in a third direction that crosses and is not parallel to the first direction and a fourth region having an orientation-regulating force for orienting the liquid crystal molecules in a fourth direction that is opposite to the third direction; and the first sub-domain is formed between one of the two first regions and the third region, the second sub-domain is formed between the second region and the third region, the third sub-domain is formed

between the second region and the fourth region, and the fourth sub-domain is formed between the other one of the two first regions and the fourth region."

For example, and without limitation, Figs. 1-2 of the instant application illustrate that for a 4-divided domain, the first substrate 10 includes two first regions A1 each having an orientation-regulating force for orienting the liquid crystal molecules of the liquid crystal layer in a first direction R1, and a second region A2 provided between the two first regions A1 and having an orientation-regulating force for orienting the liquid crystal molecules in a second direction R2 that is opposite to the first direction R1 (see Fig. 2A). The second substrate 20 includes a third region A3 having an orientation-regulating force for orienting the liquid crystal molecules in a third direction R3 that crosses and is not parallel to the first direction R1, and a fourth region A4 having an orientation-regulating force for orienting the liquid crystal molecules in a fourth direction R4 that is opposite to the third direction R3 (see Fig. 2B). As shown in Figs. 1-2, the first sub-domain D1 is formed between one of the two first regions A1 and the third region A3, the second sub-domain D2 is formed between the second region A2 and the third region A3, the third sub-domain D3 is formed between the second region A2 and the fourth region A4, and the fourth sub-domain D4 is formed between the other one of the two first regions A1 and the fourth region A4. As explained on pages 17-18 and 48 of the instant application, this claimed structure unexpectedly and surprisingly allows for improved viewing characteristics to be achieved.

The Section 103(a) rejection of claim 1 is incorrect for at least the following two (2) reasons.

First Reason: The first reason is summarized as follows. The alleged third direction 13B2 (of the alleged third region) and the alleged first direction 13A1 in Sasaki do not meet the

"crosses and is not parallel to" requirement of claim 1. *In the interview held on July 20, 2004, the Examiner suggested this language to define over the cited art.* Thus, even if the two references were combined as alleged in the Office Action (which would be incorrect in any event), the invention of claim 1 still would not be met.

Regarding the first reason, the Office Action admits that Suzuki fails to disclose or suggest the claimed first, second, third and fourth regions having the respective claimed first, second, third and fourth orientation-regulating directions. Admitting this fundamental flaw in Suzuki, the Office Action cites Sasaki. However, Sasaki also fails to disclose or suggest this aspect of claim 1. For example, the alleged third direction 13B2 (or the alleged third region) in Sasaki does not cross in a non-parallel manner the alleged first direction 13A1. Thus, *even if the two references were combined as alleged in the Office Action, the invention of claim 1 still would not be met.* For at least this first reason, the Section 103(a) rejection of claim 1 is incorrect and should be withdrawn.

Second reason: Claim 1 calls for a *vertical alignment* type LC layer. Sasaki also discloses a vertical alignment type LC layer. However, Suzuki discloses an LCD of the TN type which uses horizontal alignment and does not use vertical alignment films. TN and Vertical Alignment type LCDs functions much different from one another, and are optically unlike one another. One of ordinary skill in the art would never have combined domain generating structures of a vertical alignment type LCD with a non-vertical alignment TN type LCD as alleged in the Office Action. The technologies are entirely different from one another with respect to alignment and with respect to domain generation – there is clearly no suggestion in the art of record for such a combination, especially since one of ordinary skill in the art would have recognized the significant optical and liquid crystal differences between the TN type display of

Suzuki and the VA (vertical alignment) type display of Sasaki and would never have combined such diverse technologies in a domain-related manner. Stated another way, one would not have combined Suzuki and Sasaki with regard to domain generation because the two references use entirely different types of liquid crystal layers which cannot be combined for domain-related reasons.

In an LCD having a liquid crystal layer of the vertical alignment type, there exists a problem concerning viewing angle; when a viewing angle with respect to normal is increased in a white display, substantially no anisotropy of the index of refraction of the LC molecules may exist at a certain viewing angle(s) and thus the LCD may possibly be inverted to a black or dark display. Suzuki and Sasaki each essentially relate to mainly two-domain systems and thus cannot solve this problem. On the other hand, since the invention of claim 1 requires at least four domains, good viewing angle characteristics can be realized in all or many directions.

Again, Suzuki relates to a TN type display where the LC layer includes a two-divided domain in a horizontal alignment type system, and the LC molecules have a clockwise twist between the upper and lower substrates. In contrast, Sasaki discloses a display that uses vertical alignment. These two display technologies are quite different from one another and are not combinable as alleged in the Office Action. Furthermore, Suzuki relates to a 2-domain system which is entirely unrelated to the display of claim 1 which requires at least 4 domains.

Claim 15

Claim 15 defines over the cited art for the reasons set forth above with respect to claim 1.

Claims 21-24

Claims 21 and 23 require that the 4-divided domain includes two different liquid crystal twist directions in that LC molecules in the 4-divided domain have both a clockwise twist direction and a counterclockwise twist direction in the presence of an applied voltage.

Claims 22 and 24 require that the first and third sub-domains comprise liquid crystal molecules twisting in the clockwise twist direction in the presence of the applied voltage, and the second and fourth sub-domains comprise liquid crystal molecules twisting in the counterclockwise twist direction in the presence of the applied voltage.

The cited art fails to disclose or suggest the aforesaid aspects of claims 21-24.

Claim 16

Claim 16 requires that “for the 4-divided domain, the first substrate includes two first regions each having an orientation-regulating force for orienting the liquid crystal molecules of the liquid crystal layer in a first direction and a second region provided between the two first regions and having an orientation-regulating force for orienting the liquid crystal molecules in a second direction that is opposite to the first direction, while the second substrate includes a third region having an orientation-regulating force for orienting the liquid crystal molecules in a third direction that crosses and is not parallel to the first direction and a fourth region having an orientation-regulating force for orienting the liquid crystal molecules in a fourth direction that is opposite to the third direction.” The cited art fails to disclose or suggest this aspect of claim 16. As explained above, the alleged first and third directions in the cited art are parallel and thus cannot cross each other.

Claim 17

Claim 17 requires that the first and third directions are perpendicular to each other. The cited art fails to disclose or suggest this aspect of claim 17. As explained above, the alleged first

and third directions in the cited art are parallel and thus cannot be perpendicular as required by claim 17.

Claim 25

Claim 25 also requires "a third direction that crosses and is not parallel to the first direction." Again, the cited art fails to disclose or suggest this aspect of claim 25, either alone or in combination.

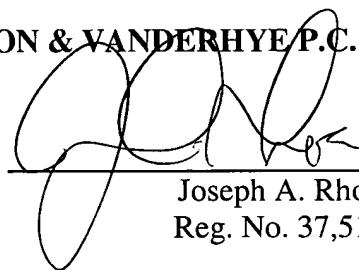
Conclusion

For at least the foregoing reasons, it is respectfully requested that all rejections be withdrawn. All claims are in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By:



Joseph A. Rhoa
Reg. No. 37,515

JAR:caj
1100 North Glebe Road, 8th Floor
Arlington, VA 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100